IXYS Advance Technical Information

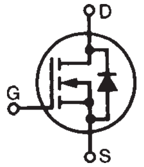
PolarHV™ HiPerFET Power MOSFET ISOPLUS247™

IXFR 48N60P

V_{DSS}	=	600	V
I_{D25}	=	32	A
$R_{DS(on)}$	≤	160	mΩ
t_{rr}	≤	250	ns

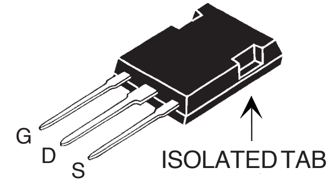
N-Channel Enhancement
Mode Avalanche Rated
Fast Intrinsic Diode

(Electrically Isolated Back Surface)



Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	600	V
V_{DGR}	T_J = 25°C to 150°C; R_{GS} = 1 MΩ	600	V
V_{GSS}	Continuous	±30	V
V_{GSM}	Transient	±40	V
I_{D25}	T_C = 25°C	32	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	110	A
I_{AR}	T_C = 25°C	32	A
E_{AR}	T_C = 25°C	70	mJ
E_{AS}	T_C = 25°C	2.0	J
dv/dt	$I_S \leq I_{DM}$, di/dt ≤ 100 A/µs, $V_{DD} \leq V_{DSS}$, T_J ≤ 150°C, R_G = 4 Ω	20	V/ns
P_D	T_C = 25°C	300	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	°C
V_{ISOL}	50/60 Hz, RMS, 1 minute	2500	V~
F_C	Mounting Force	20..120 / 4.5..26	N/lb.
Weight		5	g

ISOPLUS247 (IXFR)
E153432



G = Gate
D = Drain
S = Source

Features

- International standard isolated package
- UL recognized package
- Silicon chip on Direct-Copper-Bond substrate
  - High power dissipation
  - Isolated mounting surface
  - 2500V electrical isolation
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
  - easy to drive and to protect
- Fast intrinsic diode

Advantages

- Easy to mount
- Space savings
- High power density

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	 Typ.	 Max.	
V_{DSS}	V_{GS} = 0 V, I_D = 250 µA	600			V
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 8 mA	3.0		5.0	V
I_{GSS}	V_{GS} = ±30 V_{DC}, V_{DS} = 0			±200	nA
I_{DSS}	V_{DS} = V_{DSS}			25	µA
	V_{GS} = 0 V T_J = 125°C			1000	µA
$R_{DS(on)}$	V_{GS} = 10 V, I_D = I_T			160	mΩ

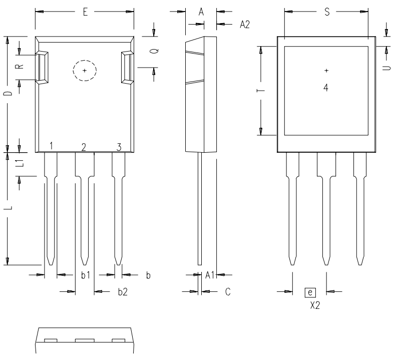
Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) Min.	Typ.	Max.	
g_{fs}	V_{DS} = 20 V; $I_D = I_T$, Notes 1, 2	35	53		S
C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		8860		pF
C_{oss}			850		pF
C_{rss}			60		pF
$t_{d(on)}$	$V_{DS} = 0.5\ V_{DSS}$, $I_D = 0.5\ I_T$, V_{GS} = 10 V R_G = 2 Ω (External)		30		ns
t_r			25		ns
$t_{d(off)}$			85		ns
t_f			22		ns
$Q_{g(on)}$	V_{GS} = 10 V, $V_{DS} = 0.5\ V_{DSS}$, $I_D = 0.5\ I_{D25}$		150		nC
Q_{gs}			50		nC
Q_{gd}			50		nC
R_{thJC}				0.42	K/W
R_{thCK}			0.15		K/W

Source-Drain Diode

Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
I_S	V_{GS} = 0 V			32	A
I_{SM}	Repetitive			110	A
V_{SD}	$I_F = I_S$, V_{GS} = 0 V, Note 1			1.5	V
t_{rr}	I_F = 20A, -di/dt = 100 A/µs V_R = 480V			250	ns
Q_{RM}			0.8		µC
I_{RM}			6.0		A

Notes:
1. Pulse test, t ≤ 300 µs, duty cycle d ≤ 2 %;
2. Test current I_T = 24 A.

ISOPLUS247 Outline



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.045	.055	1.14	1.40
b1	.075	.084	1.91	2.13
b2	.115	.123	2.92	3.12
C	.024	.031	0.61	0.80
D	.819	.840	20.80	21.34
E	.620	.635	15.75	16.13
e	.215 BSC		5.45 BSC	
L	.780	.800	19.81	20.32
L1	.150	.170	3.81	4.32
Q	.220	.244	5.59	6.20
R	.170	.190	4.32	4.83
S	.520	.540	13.21	13.72
T	.620	.640	15.75	16.26
U	.065	.080	1.65	2.03

1 - GATE
2 - DRAIN (COLLECTOR)
3 - SOURCE (EMITTER)
4 - NO CONNECTION

NOTE: This drawing will meet all dimensions requirement of JEDEC outline TO-247AD except screw hole.

Fig. 1. Output Characteristics @ 25ºC

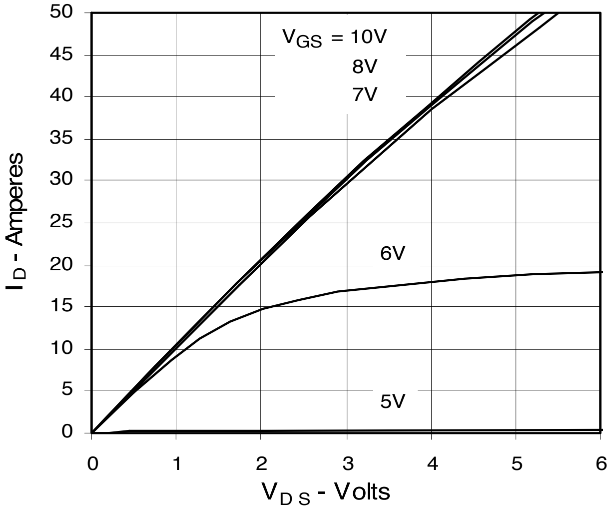


Fig. 2. Extended Output Characteristics @ 25ºC

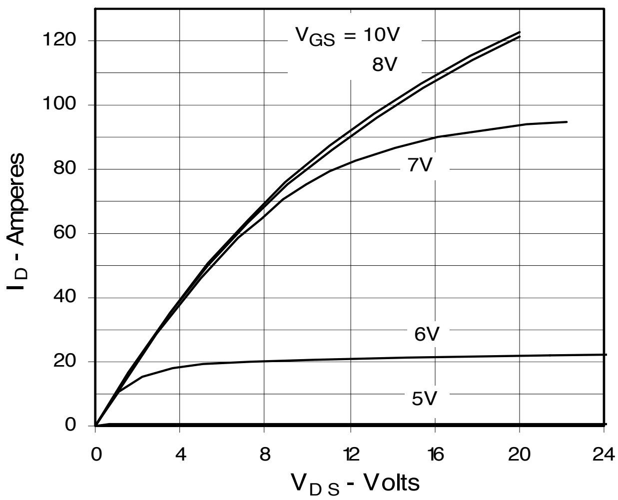


Fig. 3. Output Characteristics @ 125ºC

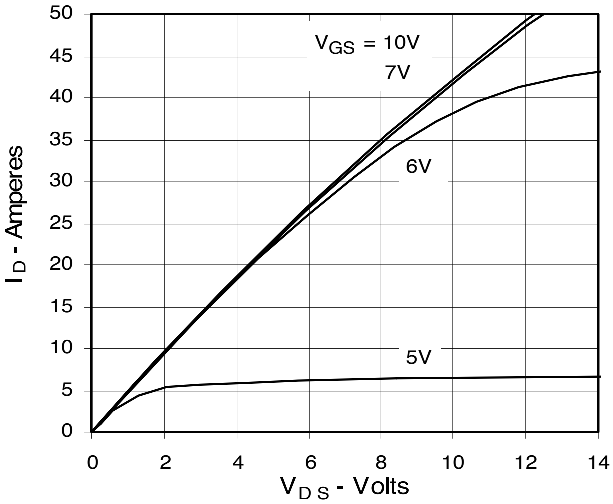


Fig. 4. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. Junction Temperature

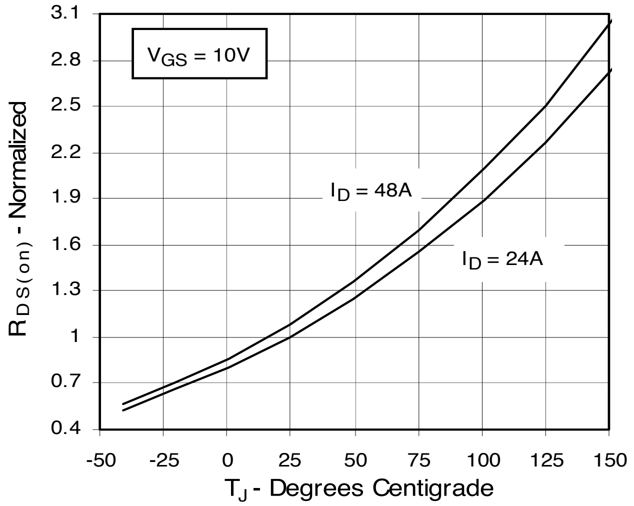


Fig. 5. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. I_D

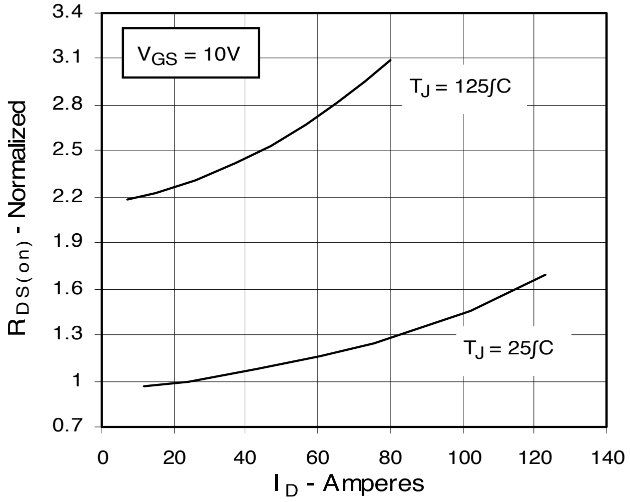


Fig. 6. Drain Current vs. Case Temperature

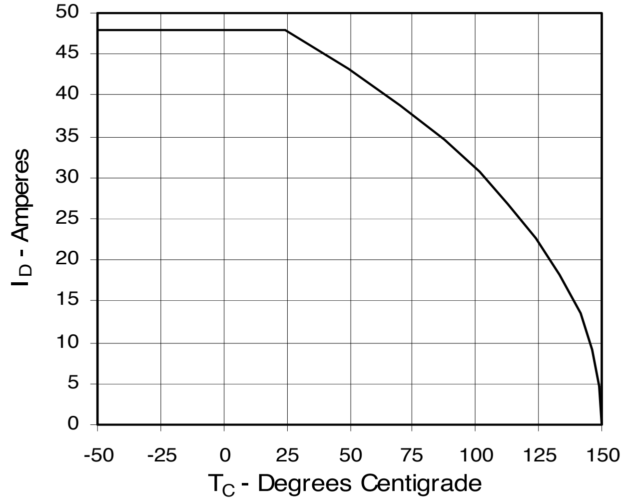


Fig. 7. Input Admittance

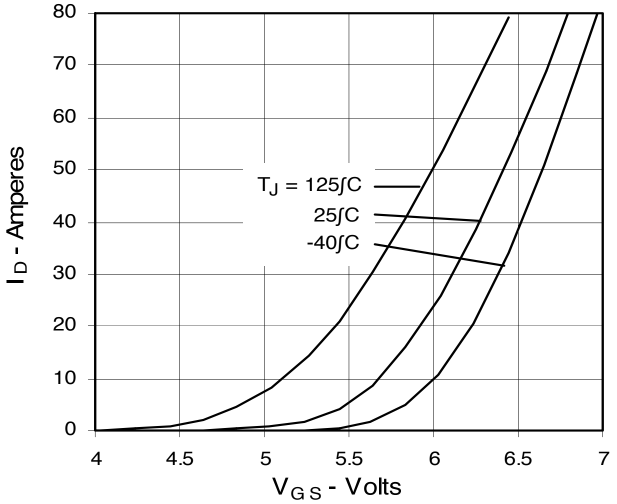


Fig. 8. Transconductance

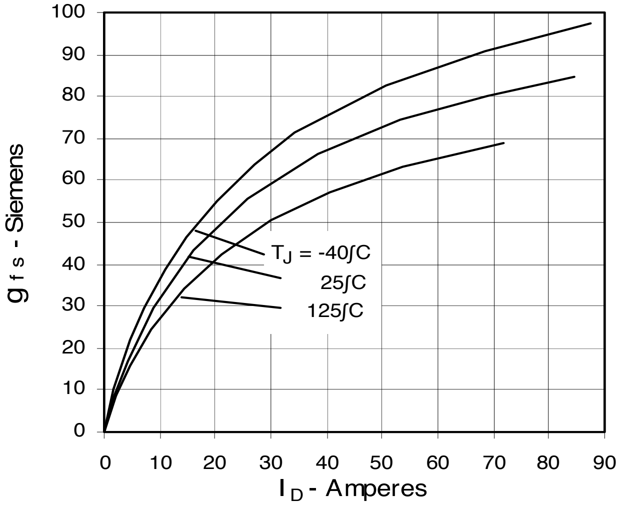


Fig. 9. Source Current vs. Source-To-Drain Voltage

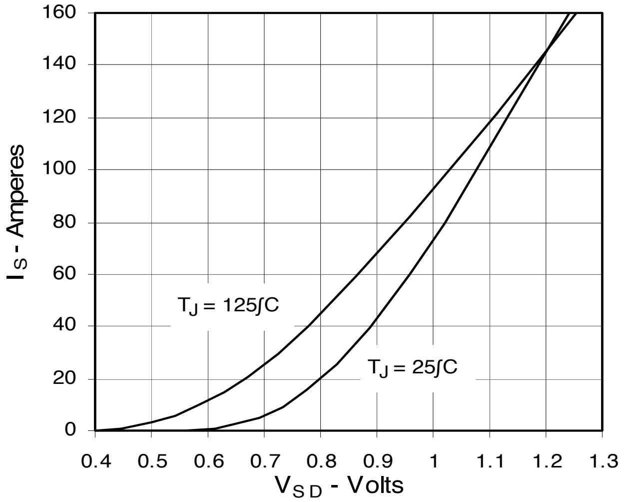


Fig. 10. Gate Charge

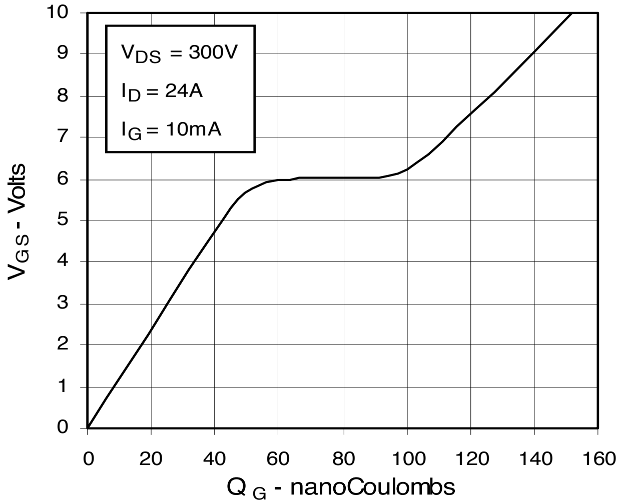


Fig. 11. Capacitance

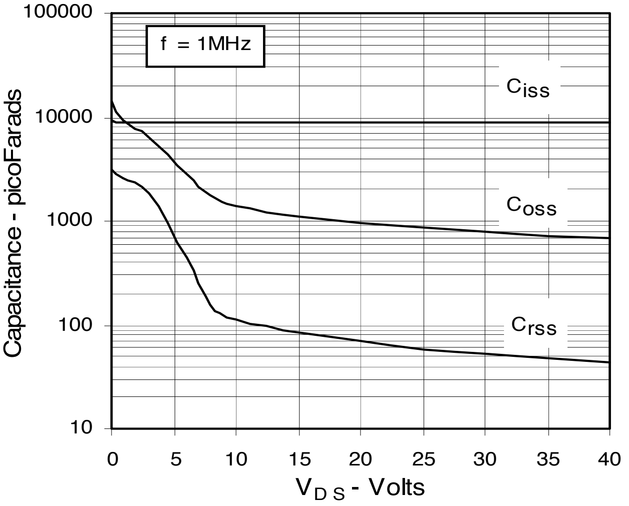


Fig. 13. Maximum Transient Thermal Resistance